

CLAIMS

1. An ink bag holding ink therein, comprising:  
a flexible bag body of a generally rectangular  
5 form; and  
a holding member attached to one edge of said bag  
body,

said holding member comprising: an ink filling  
opening for filling said bag body with ink; an ink discharging  
10 opening for discharging the ink inside said bag body; and an  
engaging part for holding said ink bag to a cartridge case in  
which said ink bag is accommodated.

2. The ink bag as claimed in claim 1, wherein a  
15 width-to-height ratio (W/H) of said bag main body falls in the  
range of  $1 \leq W/H \leq 1.5$ .

3. The ink bag as claimed in claim 1, wherein  
said ink filling opening and said ink discharge port of said  
20 holding member is located generally at a center of an edge of  
said bag main body.

4. The ink bag as claimed in claim 1, wherein  
said holding member of said ink bag is held in such a state  
25 that said ink discharge port is located generally at the

center of said cartridge case in a height direction thereof  
when said ink bag is accommodated in said cartridge case.

5        5. The ink bag as claimed in claim 1, wherein said  
ink filling opening is sealed by welding in the state in which  
said bag main body is filled with ink.

10       6. The ink bag as claimed in claim 1, wherein said  
holding member is provided to a longer edge of said ink bag  
main body.

15       7. The ink bag as claimed in claim 1, further  
comprising, at said ink discharging port, an elastic member  
sealing an opening at a distal end part of said ink  
discharging port and a cap member holding down said elastic  
member.

20       8. The ink bag as claimed in claim 7, wherein said  
holding member includes a stepped part on a circumferential  
surface of said ink discharge port for engagement with an  
engaging piece provided on said cap member.

25       9. The ink bag as claimed in claim 7, wherein said  
elastic member is a columnar member of a rubber material of  
any of silicone, fluorine and a butyl.

10. The ink bag as claimed in claim 7, wherein said cap member is a cylindrical member having a flange part that holds down said elastic member, and wherein said cylindrical member has plural engaging pieces bent inward.

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11. An ink cartridge accommodating an ink bag, comprising:

at least first and second case parts having a similar external form and forming a single case body when assembled with each other,

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said first and second case parts being configured such that said single case body can be disassembled into said first and second case parts,

said ink bag comprising: a flexible bag body of a generally rectangular form; and a holding member attached to one edge of said bag body, said holding member comprising: an ink filling opening for filling said bag body with ink; an ink discharging opening for discharging the ink inside said bag body; and an engaging part for holding said ink bag to a cartridge case in which said ink bag is accommodated,

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wherein said holding member of said ink bag is held to an engaging part provided to said first case part.

12. An ink-jet recording apparatus capable of being loaded with an ink cartridge accommodating therein an ink bag

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from a front side thereof,

said ink cartridge comprising:

at least first and second case parts having a similar external form and forming a single case body when  
5 assembled with each other,

said first and second case parts being configured such that said single case body can be disassembled into said first and second case parts,

said ink bag comprising: a flexible bag body of a  
10 generally rectangular form; and a holding member attached to one edge of said bag body, said holding member comprising: an ink filling opening for filling said bag body with ink; an ink discharging opening for discharging the ink inside said bag body; and an engaging part for holding said ink bag to a  
15 cartridge case in which said ink bag is accommodated,

wherein said holding member of said ink bag is held to an engaging part provided to said first case part.

13. An ink refilling method for filling ink into an  
20 ink bag accommodated in an ink cartridge, said ink cartridge comprising: at least first and second case parts having a similar external form and forming a single case body when assembled with each other, said first and second case parts being configured such that said single case body can be  
25 disassembled into said first and second case parts, said ink

bag comprising: a flexible bag body of a generally rectangular form; and a holding member attached to one edge of said bag body, said holding member comprising: an ink filling opening for filling said bag body with ink; an ink discharging opening  
5 for discharging the ink inside said bag body; and an engaging part for holding said ink bag to a cartridge case in which said ink bag is accommodated, said holding member of said ink bag being held to an engaging part provided to said first case part,

10               said method filling said ink from said ink filling opening in a state in which said holding member of said ink bag is engaged to said first case part.

14. The ink refilling method as claimed in claim 13,  
15 wherein said ink is refilled from said ink discharge port in the state in which said holding member of said ink bag is held to said first case part.

15. The ink refilling method as claimed in claim 13,  
20 comprising the steps of:

forming any of a rupture part to a part of said bag main body of said ink bag;

refilling said ink into said bag main body from said rupture part; and

25               sealing said rupture part after said refilling step.

16. A manufacturing method of an ink cartridge  
accommodating an ink bag, said ink cartridge comprising: at  
least first and second case parts having a similar external  
form and forming a single case body when assembled with each  
5 other, said first and second case parts being configured such  
that said single case body can be disassembled into said first  
and second case parts, said ink bag comprising: a flexible bag  
body of a generally rectangular form; and a holding member  
attached to one edge of said bag body, said holding member  
10 comprising: an ink filling opening for filling said bag body  
with ink; an ink discharging opening for discharging the ink  
inside said bag body; and an engaging part for holding said  
ink bag to a cartridge case in which said ink bag is  
accommodated, said holding member of said ink bag being held  
15 to an engaging part provided to said first case part,

said manufacturing method comprising the steps of:  
holding said holding member of said ink bag to said  
first case part, said ink bag being filled with said ink; and  
attaching said second case part to said first case  
20 part.

17. A recycling method of an ink cartridge  
accommodating an ink bag therein, said ink cartridge  
comprising: at least first and second case parts having a  
25 similar external form and forming a single case body when

assembled with each other, said first and second case parts  
being configured such that said single case body can be  
disassembled into said first and second case parts, said ink  
bag comprising: a flexible bag body of a generally rectangular  
5 form; and a holding member attached to one edge of said bag  
body, said holding member comprising: an ink filling opening  
for filling said bag body with ink; an ink discharging opening  
for discharging the ink inside said bag body; and an engaging  
part for holding said ink bag to a cartridge case in which  
10 said ink bag is accommodated, said holding member of said ink  
bag being held to an engaging part provided to said first case  
part,

said recycling method comprising the steps of:

disassembling said single case body into first and  
15 second case parts;

removing said ink bag by removing said holding  
member from said first case part;

engaging said holding member of said ink bag filled  
with ink to said engagement holding part of said first case  
20 part; and

assembling said first and second case parts into  
said single case.

18. An ink bag holding member for holding an ink  
25 bag main body having flexibility in an ink cartridge, said

holding member comprising:

an ink filling opening for filling ink to said bag  
main body;

an ink discharge port for discharging said ink  
5 inside said bag main body; and

an engaging part for engagement with a  
corresponding engagement part provided to at least one of case  
half bodies, said case half bodies constituting together a  
cartridge case of said ink cartridge.

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19. The ink bag holding member as claimed in claim  
18, wherein said ink bag holding member is fixed to an edge of  
said bag main body of generally square form by welding, said  
ink bag holding member being held to said cartridge case  
15 detachably.

20. The ink bag holding member as claimed in claim  
18, wherein said ink bag holding member has a tapered  
connection part at an end welded to said bag main body,  
20 said connection part, said ink filling opening and said ink  
discharge port being formed on different surfaces of a flange  
part.

21. The ink bag holding member as claimed in claim  
25 20, wherein there is formed a groove on a side surface of said

flange part.

22. The ink bag holding member as claimed in claim 1, wherein said ink filling opening is sealed with welding.

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23. An ink cartridge accommodating therein an ink bag,

said ink bag comprising:

an ink filling opening for filling ink to said bag

10 main body;

an ink discharge port for discharging said ink inside said bag main body; and

an engaging part for engagement with a corresponding engagement part provided to at least one of case half bodies, said case half bodies constituting together a cartridge case of said ink cartridge.

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24. An ink-jet recording apparatus loaded with an ink cartridge from a front side thereof, said ink cartridge accommodating therein an ink bag,

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said ink bag comprising:

an ink filling opening for filling ink to said bag

main body;

an ink discharge port for discharging said ink

25 inside said bag main body; and

an engaging part for engagement with a corresponding engagement part provided to at least one of case half bodies, said case half bodies constituting together a cartridge case of said ink cartridge.

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25. An ink cartridge for supplying ink to outside through an ink discharge port, comprising:

case half bodies forming together a single cartridge case of said ink cartridge, at least one of said  
10 case half bodies having a holding part for holding a holding member formed with said ink discharge port;

an elastic member provided at a distal end part of said ink discharge port of said holding member for sealing an opening; and

15 a cap member for holding down said elastic member.

26. The ink cartridge as claimed in claim 25, wherein there is provided a stepped part to a circumference surface of said ink discharge port so as to engage with an  
20 engaging piece provided it to said cap member.

27. The ink cartridge as claimed in claim 25, wherein said elastic member is formed of a rubber material selected from any of a silicone rubber material, a fluorine  
25 rubber material and a butyl rubber material.

28. The ink cartridge as claimed in claim 25,  
wherein said cap member comprises a cylindrical member having  
a flange part for holding down said elastic member, and  
wherein said cylindrical member having plural engaging piece  
5 bent inward.

29. An ink-jet recording apparatus loaded with an  
ink cartridge from a front side thereof,

said ink cartridge supplying ink to said ink-jet  
10 recording apparatus through an ink discharge port and  
comprising:

case half bodies forming together a single  
cartridge case of said ink cartridge, at least one of said  
case half bodies having a holding part for holding a holding  
15 member formed with said ink discharge port;

an elastic member provided at a distal end part of  
said ink discharge port of said holding member for sealing an  
opening; and

a cap member for holding down said elastic member.  
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30. An ink bag for holding ink, comprising:

a flexible bag main body; and

a holding member fixed to said bag main body,

said holding member comprising an ink filling  
25 opening for filling ink to said bag main body, an ink

discharge port for discharging said ink inside said bag main body, and an engaging part for holding said ink bag to a cartridge case formed of case half bodies.

5           31. The ink bag as claimed in claim 30, wherein said ink discharge port includes a cylindrical part forming an outlet hole of said ink inside said bag main body, and wherein said cylindrical part is formed with a material that does not exert influence to properties of said ink.

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32. The ink bag as claimed in claim 31, wherein said cylindrical part has a holding part holding an elastic member inserted to said outlet hole for sealing in the form of a unitary body.

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33. The ink bag as claimed in claim 30, wherein said ink discharge port has an elastic member for sealing an outlet hole of said ink inside said bag main body, and wherein said elastic member is formed with a material that does not  
20 exert influence on properties of said ink.

34. The ink bag as claimed in claim 33, wherein said elastic member is formed of a rubber of silicone or silicone based rubber not exerting influence to properties of  
25 said ink.

35. The ink bag as claimed in claim 30, wherein  
said ink discharge port is provided with a cap member so as to  
cover at least a part of an elastic member sealing an ink  
outlet hole of the ink inside said bag main body, said cap  
5 member being formed with a material not exerting influence on  
the properties of said ink.

36. The ink bag as claimed in claim 34, wherein  
there is formed a stepped part for engagement with an engaging  
10 piece provided to said cap member on a circumferential surface  
of said ink discharge port.

37. An ink bag as claimed in claim 34, wherein said  
cap member is formed of a cylindrical member having a flange  
15 part for holds down said elastic member, and wherein said  
cylindrical part has plural engaging pieces bent inward.

38. The ink bag as claimed in claim 33, wherein  
an outer diameter D of said elastic member and an inner  
20 diameter D' of a part to which said elastic member is inserted  
forms a ratio  $D:D'$  so as to fall in the range of  $1:0.85 -$   
 $1:0.92$ .

39. The ink bag as claimed in claim 33, wherein a  
25 thickness t of the said elastic member and a depth H of a part

in which said elastic member is inserted forms a ratio  $t:H$  falling in the range of  $1:0.77 - 1:1$ .

40. The ink bag as claimed in claim 33, wherein a  
5 hollow needle pierced into said elastic member for taking out  
said ink held inside said bag main body has a diameter  $d$   
determined such that a ratio  $d:D$  of said diameter  $d$  to an  
outer diameter  $D$  of said elastic member falls in a range of  
 $1:3 - 1:10$ .

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41. The ink bag as claimed in claim 33, wherein a  
hollow needle pierced into said elastic member for taking out  
said ink held inside said bag main body has a diameter  $d$   
determined such that a ratio  $d:t$  of said diameter  $d$  to a  
15 thickness  $t$  of said elastic member falls in a range of  $1:1.5 -$   
 $1:3.5$ .

42. The ink bag as claimed in claim 30, wherein  
said holding member of said ink bag is held in a state that  
20 said ink discharge port is located generally at a center in a  
height direction of said cartridge case when said ink bag is  
accommodated in said cartridge case.

43. The ink bag as claimed in claim 30, wherein  
25 said ink filling opening is sealed by welding in the state in

which said ink bag is filled with said ink.

44. An ink cartridge accommodating an ink bag therein, comprising:

5           at least first and second cases parts of similar external appearance, said first case part and said second case part forming a single cartridge case when assembled with each other,

          said single cartridge case being disassembled into  
10   said first and second case parts,

          said ink bag comprising: a flexible bag main body; and a holding member fixed to said bag main body, said holding member comprising an ink filling opening for filling ink to said bag main body, an ink discharge port for discharging said  
15   ink inside said bag main body, and an engaging part for holding said ink bag to a cartridge case formed of case half bodies,

          said holding member of said ink bag being held to an engagement holding means provided to said first case part.  
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45. An ink-jet recording apparatus loaded with an ink cartridge holding ink therein,

          said ink cartridge comprising:

          at least first and second cases parts of similar  
25   external appearance, said first case part and said second case

part forming a single cartridge case when assembled with each other,

said single cartridge case being disassembled into said first and second case parts,

5               said ink bag comprising: a flexible bag main body; and a holding member fixed to said bag main body, said holding member comprising an ink filling opening for filling ink to said bag main body, an ink discharge port for discharging said ink inside said bag main body, and an engaging part for  
10 holding said ink bag to a cartridge case formed of case half bodies,

said holding member of said ink bag being held to an engagement holding means provided to said first case part.

15               46. An ink-jet recording apparatus as claimed in claim 45, wherein said ink cartridge is loaded from a front side of an apparatus body of said ink-jet recording apparatus.